3D ULTRASOUND SYSTEM AND METHOD FOR OPERATING 3D ULTRASOUND SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

This application is Continuation of U.S. patent application Ser. No. 13/927,974, filed on Jun. 26, 2013, which is a Continuation of U.S. patent application Ser. No. 13/044,195, filed on Mar. 9, 2011, now U.S. Pat. No. 8,491,480, which claims the benefit of Korean Patent Application No. 10-2010-0051124, filed on May 31, 2010, in the Korean Intellectual Property Office, the disclosures of which is incorporated herein by reference.

BACKGROUND

1. Field of the Invention

The present invention relates to a 3-dimensional (3D) ultrasound system and a method for operating a 3D ultrasound system capable of detecting edges from a plurality of side images of an object in a human body with respect to a region of interest (ROI) image in an image of the object and automatically measuring the thickness of the image using the detected edges.

2. Description of the Related Art

An ultrasound system is an apparatus that irradiates an ultrasound signal from a surface of a human body towards a target part, that is, an object such as a fetus, an internal organ, and the like, under the body surface and obtains an image of a monolayer or blood flow in soft tissue from information in the reflected ultrasound signal. The ultrasound system has been widely used together with other image diagnostic systems such as X-ray diagnostic systems, computerized tomography (CT) scanners, magnetic resonance image (MRI) systems and nuclear medicine diagnostic systems because of its various merits such as a small size, a low price, real-time image display, and high stability through elimination of any radiation exposure.

Also, a method for diagnosing a Down's syndrome fetus is to measure the thickness of a fetus' nuchal translucency (NT) through an ultrasound system. Here, the ultrasound system may measure the thickness of the fetus' NT, using a figure template controlled according to a combination of a trackball and a set button, controlled by a user.

Accordingly, when the thickness of an object or a partial region is measured using the ultrasound system, intervention of a user is unavoidable, and it is impossible to precisely measure the thickness of the object due to the intervention of the user.

Therefore, an ultrasound system capable of easily providing a precise measurement result by automating a series of processes for measuring the thickness of an object, and capable of minimizing the intervention of a user, is desired.

SUMMARY

An aspect of the present invention provides a 3-dimensional (3D) ultrasound system and a method for operating a 3D ultrasound system, in which edges are detected from a plurality of side images of an object in a human body with respect to a region of interest (ROI) image in an image of the object, and the thickness of the image is automatically measured using the detected edges, to enable a precise measurement result of the thickness of the image to be provided.

According to an aspect of the present invention, there is provided a 3D ultrasound system including an extractor to scan an image of an object in a human body and to extract an ROI image in an inputted ROI with respect to a selected image, a processor to detect edges from a plurality of side images of the object with respect to the ROI image, and a controller to measure the thickness of the image using the detected edges.

According to an aspect of the present invention, there is provided a method for operating a 3D ultrasound system, the method including scanning an image of an object in a human body and extracting an ROI image in an inputted ROI with respect to a selected image, detecting edges from a plurality of side images of the object with respect to the ROI image, and measuring the thickness of the image using the detected edges.

BRIEF DESCRIPTION OF THE DRAWINGS

These and/or other aspects, features, and advantages of the invention will become apparent and more readily appreciated from the following description of exemplary embodiments, taken in conjunction with the accompanying drawings of which:

FIG. **1** is a block diagram illustrating a configuration of a 3-dimensional (3D) ultrasound system according to an embodiment of the present invention;

FIG. **2** is a diagram illustrating an example of measuring the thickness of a specific image in a 3D ultrasound system according to the embodiment of the present invention; and

FIG. **3** is a flowchart illustrating a method for operating a 3D ultrasound system according to an embodiment of the present invention.

DETAILED DESCRIPTION

Reference will now be made in detail to exemplary embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to the like elements throughout. Exemplary embodiments are described below to explain the present invention by referring to the figures.

FIG. **1** is a block diagram illustrating a configuration of a 3-dimensional (3D) ultrasound system **101** according to an embodiment of the present invention.

Referring to FIG. **1**, the 3D ultrasound system **101** includes an extractor **103**, a processor **105**, and a controller **107**.

The extractor **103** may scan an image of an object in a human body and extract a region of interest (ROI) image in an inputted ROI with respect to a specific image. Here, the object in the human body may be a fetus, blood vessel, an internal organ, and the like. The ROI defines a partial region in which the thickness of a specific image in an object is to be measured, and may be inputted by a user.

For example, in a case where the object is a fetus, the extractor **103** may extract an ROI image in the ROI inputted to include the fetus' nuchal translucency (NT).

The extractor **103** may perform denoising with respect to the extracted ROI image, so as to clarify an image in a region, of which thickness is to be measured.

As an example, the processor **105** detects edges from a plurality of side images of the object with respect to the ROI image. In this instance, the processor **105** may detect first edges of which brightness intensity is changed from a large value to a small value from the plurality of side images, and may detect second edges of which brightness intensity is change from a small value to a large value from the plurality of side images. That is, the processor may detect first edges at which a bright image is changed into a dark image from the